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# THE SCIENCE NEWS-LETTER

A Weekly Summary of Current Science

EDITED BY WATSON DAVIS

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## STARTING A NEW DISEASE

By Dr. Edwin E. Slosson

We would suppose that there were diseases enough in the world so that no one would rejoice over a new one. Yet few of the thousand papers read before the recent session of the American Association for the Advancement of Science aroused more enthusiasm than that in which Dr. James Johnson of the University of Wisconsin told how he had started a novel malady in tobacco and tomato plants by inoculating them with the juice of healthy potato vines. The diseased plants may in turn infect other plants of the same or other sort and so on indefinitely, the virulence of the virus increasing with each stage.

It seems that what is one plant's food is another plant's poison and that the wholesome sap of the harmless necessary tuber may induce a fatal infection of the weed whose poisonous nature we were warned against in childhood.

The disease is first manifested as a faint mottling of the larger leaves of the young plants but after passing through two or more generations of tobacco it becomes intensified and causes dead spots or blotches. It belongs therefore to the class called "mosaic diseases", not in reference to the Mosaic law but because they are commonly recognizable by scattered white patches that make the leaf look like a cross-word puzzle, only there isn't any answer to it, or at least the biologists have not yet found the answer.

They do not even know whether the virus of the mosaic diseases belongs to them or to the chemists. It seems to stand somewhere between the two sciences, between the animate and inanimate kingdoms, if there is such an intermediate state. There are dozens of different mosaic diseases known in the plant world, as definite and distinguishable by habit, host and symptoms as are smallpox and measles. The active agency, whatever it may be, can multiply indefinitely and infect in succession any number of other plants in the vicinity to which the virus may be carried by sucking insects, as mosquitoes or fleas carry malaria or plague. From this we should naturally infer that a mosaic disease is due to a minute living organism, a microbe.

But this appears impossible because of their extreme minuteness. They cannot be discerned with the most powerful microscope. They pass through the pores of a collodion membrane or a filter of unglazed porcelain, such as is supposed to take out every solid and suspended particle and pass only pure water and the salts dissolved in it. This would make them out so small that it would take some forty or fifty thousand of them side by side, to measure up to a millimeter, or some



three thousand of them to be as thick as this sheet of paper.

"But", says the chemist, "such a minute mass would be a mere structureless sphere. It is smaller than a molecule of protoplasm and could not possibly contain all the machinery essential for a living creature and its descendants. Besides molecules don't breed."

"But don't they?" retorts the biologist. At least Dr. Johnson suggests as a possible solution of the mosaic problem that the ultimate molecule or particle of the virus may be capable of reproducing itself when transplanted into the favorable environment of the living cells of the host plant. Another suggestion is that the virus injected into the cell may stimulate this to production of some substance, injurious to itself, which in turn is capable of setting up a similar stimulus in other cells. There is a third possibility, that is, that the apparently healthy potato was a carrier to the virus of tobacco plant as certain people, without harm to themselves, will harbor and distribute the typhoid germ. But this last theory is highly improbable for Dr. Johnson used extracts from fifty different potato vines, the best to be found on the farm, and got infections of tobacco from them in every case. He tried inoculating tobacco with forty species of plants other than potato but failed to get any symptoms of disease.

So it seems that there must be something in the cell sap of the potato that starts a self-perpetuating disturbance of some sort in plants of the same family. But the susceptibility appears to be confined to the Solanums so nobody need fear the potato unless he belongs to the family. Nor do any of the mosaic diseases attack human beings. I mention this lest the reader should get a prejudice against the potato and leave it out of his dietary for fear of getting spotted skin.

The Solanum family has suffered from a bad reputation, perhaps because it comprises such unwholesome plants as belladonna, henbane, and jimson weed. Potato, tomato and tobacco when they were introduced into Europe a few hundred years ago, met with furious opposition. They were all three accused of being injurious to both health and morals. But the potato and tomato are now welcome to the most exclusive tables and the tobacco is welcome at all tables except the most exclusi-

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#### ACCURATE EARTHQUAKE PREDICTIONS POSSIBLE

Earthquakes may soon be predicted with as much certainty as forecasts of storms or floods are now made. The preliminary shiftings and writhings of the earth's crust, imperceptible to human beings but easily detected by sensitive instruments, have been successfully used by scientists at Volcano House, on the rim of the crater of Kilauea, to give warning of a coming quake.

On the first occasion when a test case was made, it was observed during a period of about a month that there was a decided southerly tilt of the crater's north rim. This suddenly changed to a northerly tilt at the end of the month, and a few days later veered back to its original position. Had such changes occurred when the crater was full of lava they would have been alarming, but fortunately the volcano was nearly empty at the time. On the strength of the position changes, however, it was predicted that a perceptible shock would come within a few days. The prophecy was fulfilled two days later, when a shock, not severe but quite perceptible, rocked the island.



R. H. Finch, of Volcano House, who describes the method used in predicting, adds that some of the popular ideas about preliminary symptoms of earthquakes have very little solid support. The so-called "earthquake weather", he says, is an unreliable indication. During the first part of 1924 in Hawaii there was a long spell of such sultry and oppressive weather, with an unusually small number of shocks.

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#### TYPE SPECIMENS OF ALL BACTERIA TO BE PRESERVED AT MCCORMICK INSTITUTE

A museum containing a complete collection of living disease germs as well as useful bacteria is to be established at Chicago. Such a comprehensive collection of type cultures will be to the bacteriologist what the herbarium is to the botanist.

The herbarium enables the botanist to identify his plants by comparing them with the dried specimens. The type collection serves not only to identify new cultures by comparison with authentic ones, but since they are living cultures they can be used by investigators, manufacturers of biological products, clinicians, and others who want a particular organism for a special purpose.

For many years what was known as the Kral collection was maintained in Germany by private enterprise, but this has not been available since the beginning of the war. More recently the British Medical Research Council has established a type collection at the Lister Institute and in Holland there is a collection of fungi.

The American Museum of Natural History established a collection of bacterial type cultures under the direction of Dr. C. E. A. Winslow, curator of public health. This was maintained for some time after Dr. Winslow severed his connection with the Museum, but the necessity for curtailing expenses finally obliged them to abandon this activity. The collection was taken over by the Society of American Bacteriologists which maintained it at the Army Medical Museum in Washington. Owing to the limited funds available it was only possible to carry a limited number of bacteria and no attempt was made to include molds, fungi, or other microorganisms. In the meantime, the National Research Council was endeavoring to find some permanent source of support for the collection and finally the General Education Board recognizing the value of a collection of this kind to medical schools and other institutions teaching bacteriology, made a grant of \$24,000 to support the collection for five years.

Under this arrangement the collection will be maintained at the McCormick Institute at Chicago, of which Dr. L. Hektoen is director. The general management of the collection will be vested in a committee representing the Society of American Bacteriologists, the Society of Bacteriologists and Pathologists, the American Phytopathological Society, the American Society of Zoologists, and the McCormick Institute. The chairman of the committee is Dr. L. A. Rogers in charge of the Dairy Research Laboratories of the U. S. Department of Agriculture.

It is proposed to enlarge the scope of the collection as much as the funds available will permit. It will include not only the pathogenic bacteria, but also bacteria causing plant diseases, those used in dairying and the fermentation industries, soil and nitrogen fixing bacteria. A limited number of molds and fungi may be added and eventually the collection may include some of the protozoa or animal forms.



These cultures will be available for teachers who need a collection of type cultures for student use, for investigators who wish authentic cultures of previously described species, for identification of unknown specimens, for manufacture of antitoxins and other biological products, for manufacturers of fermentation products, for milk dealers who need a pure culture in making cultured buttermilk, and many other needs that are constantly arising. A catalog will be issued giving the name, the origin and a brief history of each organism.

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#### NAVY DIRIGIBLE ECLIPSE EXPEDITION SAW BRILLIANT CORONA

By Watson Davis, Managing Editor Science Service,  
Press Representative on Navy dirigible U. S. S.  
Los Angeles During Eclipse Flight.

A corona surpassing in brilliance any such phenomena observed at previous eclipses within the experience of the U. S. Naval Observatory astronomers rewarded the flight of the Navy dirigible Los Angeles January 24.

Piloted by Commander J. H. Klein, jr. to a mile above the surface of the ocean and some twenty miles east of Long Island, avoiding a lower menacing layer of clouds and rising above the hazy smoke of civilization, the giant airship furnished a nearly ideal observatory for the astronomers, who were headed by Capt. Edwin T. Pollock, superintendent, U. S. Naval Observatory. Some apprehension was felt before the eclipse as to the steadiness of the ship during the vital seconds of totality, but the eighteen photographic plates exposed through the four telescopic cameras on board operated by Prof. George H. Peters and C. B. Watts, Naval Observatory astronomers are expected to give interesting and valuable results when developed. C. C. Keiss, of the U. S. Bureau of Standards, operating a photographic spectroscope, exposed four plates, while W. L. Richardson, Navy photographer, with motion picture camera lashed to the exterior of a motor gondola ground out many feet of film. In a small cockpit on the top of the dirigible, A. K. Peterson, chief photographer, U. S. N., and an aviator, braved a frigid breeze blowing 40 miles an hour to secure motion pictures of the partial eclipse and the corona. Two members of the dirigible's crew manned a special automatically timed camera for photographing the fleeting shadow bands that preceded and followed totality and officers and members of the crew sketched the corona as it appeared visually.

Descriptions and drawings of the corona when compared and discussed after the eclipse flight ended revealed the fact that the corona had been unusually bright and that the coronal streamers on the upper right or northwest side of the sun showed remarkable extension. Long streamers were also visible extending from the lower left or southeast side of the eclipsed sun, while the corona was bushy and short at right angles to these two directions. This is characteristic of the corona at a time when there are not many sunspots and this coincided with expectations since a minimum point in the sunspot cycle of 11.3 years was reached only two years ago. Never before had the sun's corona been satisfactorily observed at just this point in the sunspot cycle, however, and it is expected that the photographs obtained will be of great value to the astronomers who are attempting to solve the riddle of the composition, cause, and movements of the magnificent surroundings of the sun seen by man only during eclipses.

The brilliance of the spectacle must have been due chiefly to the great



height reached by the Los Angeles and the clear weather but it is also true that conditions in the sun itself contributed largely.

In my personal observations of the corona, I paid special attention to the prominences or great sheets of incandescent gases that are seen jutting out from the edge of the moon-darkened sun. I was able to distinguish three of these prominences at Saturday's eclipse, one just slightly east of the top of the sun, one on the east limb and one on the west limb. I was surprised that these were not as red as descriptions of previous eclipses had led me to expect. In fact, they looked to me to be yellow-orange; yet they were in distinct contrast to the brilliant white of the corona that extended outwards at least two diameters of the sun. There is another phenomenon, which for the sake of my eyes and my veracity, I hope will be shown in the coronal photographs and motion pictures. A minute after totality had begun, I saw movement in the inner corona just above the prominence at the top of the sun. This took the form of semicircular arc beginning some thirty degrees to the east of the top of the sun and ending about at the top edge. My observation of this moving semi-circular band was interrupted by the ending of totality. When a great jewel of light appeared on the west edge of the sun, I noticed that I could still see the corona, although the increasing light had blotted out most of its extension. I started counting seconds and it was not until 22 seconds had passed that the corona was entirely obliterated by the reappearing sun.

This persistence of the corona makes it possible to believe two witnesses of the eclipse who were at Lakehurst during the event. Although the eclipse was only 99 per cent. total there, they were able to describe accurately the appearance of the corona, evidently demonstrating that sharp eyes are able to see the corona even where the eclipse is not quite total.

Luna maintained her reputation for fickleness when she caused the eclipse to board the Los Angeles eight seconds late according to Prof. F. B. Littell of the Naval Observatory who had charge of the timing of totality. Lags of from three to five seconds are reported from land stations. Time signals were received on the Los Angeles by radio and the ship's chronometer was checked before and after totality.

The radio room of the Los Angeles, in charge of Lieut. T. W. G. Settle, was one of the busiest places on the ship. In addition to the usual interchange of messages between the ship and her hangar home at Lakehurst, conveying weather information and orders, radio compass bearings were sent to and received from six Navy radio stations at intervals of from five to thirty minutes between the time the ship took the air and the time of eclipse. This radio information and visual bearings and ranges were used by the ship's navigator, Lt. Com. J. M. Deem, in fixing the ship's course so that the cameras in the cabin would point directly at the eclipsed sun. An account of the expedition was sent to all press association by wireless while the ship was still in the air and a short description was radio-phoned on 500 meters as an experiment in the hope that cooperating broadcasting stations would pick it up and rebroadcast it to the public.

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The Rockefeller Foundation has given 10,000,000 dinars (about \$200,000) to Jugo Slavia for the construction of a school of hygiene at Zagreb, the administrative capital of Croatia; \$40,000 for the improvement of sanitary institutions in Belgrade, and \$15,000 for the aid of needy students abroad who pledge their services after graduation to the public health service in Jugo Slavia.

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## LOS ANGELES ECLIPSE PHOTOGRAPH SHOWS NEW CORONA SPECTRUM

What is believed to be the first photographs of the spectrum of the sun's corona in the deep red region was obtained as a result of the U. S. Naval Observatory eclipse expedition on board the U. S. Navy dirigible Los Angeles.

C. C. Keiss, physicist of the U. S. Bureau of Standards, who operated a spectroscopic camera fitted with special plates sensitive to red, found upon development of his plates that he had obtained a spectrum that extends out into the deep red, a region of the coronal spectrum but meagerly known heretofore. Owing to a slight motion of the camera, the images are somewhat blurred, but it is expected that important qualitative results will be obtained after the photographs are measured and more carefully examined.

Mr. Keiss carried on his observations with the hope of getting more information about the unidentified element, called coronium, which is believed to cause in the coronal spectrum a brilliant green line and several other lines unclaimed by the known chemical elements. Further examination of Mr. Keiss's plates may reveal similar lines in the red end of the coronal spectrum.

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## RADIO BROADCASTING SUCCESSFUL FROM DIRIGIBLE ON ECLIPSE FLIGHT

The experimental broadcasting by radiophone of an account of the U. S. Naval Observatory Eclipse expedition on board the Navy dirigible Los Angeles was a success according to reports from forty-six listeners received at the U. S. Naval Air Station at Lakehurst, N. J.

Lieut. T. G. W. Settle, communications officer of the Los Angeles, reports that radio fans in Massachusetts, Connecticut, New York, Rhode Island and New Jersey are among those who received successfully the brief three minute radio talk given by Watson Davis, managing editor, Science Service, who was the press representative on the eclipse flight. The broadcasting which was unannounced and purely experimental took place on 500 meters and occurred about 12:20 Saturday (Jan. 24) while the Los Angeles was some sixty miles out at sea and a half mile in the air. The dirigible was then speeding homeward to her hangar at Lakehurst after having been a mile high observatory for the Naval Observatory astronomers and their photographic telescopes.

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## ECLIPSE FAILS TO ALTER SWING OF OCEAN TIDES

The eclipse of the sun had no direct effect on the heights of tides, according to officials of the U. S. Coast and Geodetic Survey. Variations in the height of tides are greatest and least at new and full moon, when the sun and moon are practically in the same line with the earth. At the time of the eclipse, the earth, moon and sun were lined up and the combined pull of the two heavenly bodies was being exerted on the earth and its waters; but this pull was not appreciably greater than at the usual periods of full moon.

In checking up one of the several reports of unusual tidal conditions attributed to the eclipse, experts of the Coast Survey discovered that the supposed effect occurred four hours after the eclipse and was no greater than that recorded for the day before the eclipse.

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## FINDS SEX DIFFERENT ON TWO SIDES OF BODY

The changing of sex from female to male in a number of pigeons in flocks kept for scientific study at Cold Spring Harbor, Long Island, has led Dr. Oscar Riddle, of the department of genetics of the Carnegie Institution of Washington, to some interesting and far-reaching speculations.

Dr. Riddle's observations started several years ago, when a female pigeon as a result apparently of a diseased condition, turned into a male. After a life of normal housewifely behavior, she ceased laying eggs, and after a time began conducting herself - or rather "himself" - as a male in mating behavior. When the pigeon died, it was found that the female sex gland - all female birds have but one ovary, the left - had degenerated, and that on the right side of its body a male sex gland had developed.

This led Dr. Riddle to further investigations. In many dissections which he conducted himself, and in numerous recorded cases which he examined, he discovered that wherever similar changes of sex in birds or mammals had occurred, it was always on the right side that male reproductive tissue developed, either exclusively or at least to a larger extent than it did on the left. He also found that in normal male individuals there was a tendency for the left sex gland to be smaller than the right.

The whole situation leads to the interesting suggestion, in Dr. Riddle's opinion, that there is a difference in degree of sexuality between the two halves of the body, the right side being more strongly male in male animals, and the left side more strongly female in female animals.

Another suggestion is put forth by Dr. Riddle. The determination of what sex an animal is going to be has always been supposed to be unchangeably fixed from the very beginning of life development. There are certain structures in the cell, called chromosomes, that in most cases seem to settle the matter once and for all. These changes in sex, taking place long after birth, appear to bring the whole idea of the unchangeable determination of sex into question. Dr. Riddle suggests that not only the character of sex, but "other chromosome -determined characters may have the course of their development altered; and thus heredity may not have the fatefulness usually ascribed to it. It does not follow, however, that the hereditary factors are transformed, nor that the character-transformation at all affects the succeeding generations."

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## HENS CROW AND FIGHT AFTER GLAND OPERATION

Take the female sex glands from a hen and you take away her feminine nature. Hens that fight, crow, and in other ways behave like roosters have been produced in the laboratory of Prof. Frank R. Lillie, of the University of Chicago, by a simple gland-removing operation.

L. V. Domn of the University, reported on the work, says:

"The larger percentage of our birds have assumed additional male characters following removal of the ovaries until they are practically complete replicas of the male, and to those not familiar with their history, they are regarded as unmistakable males. Thus we find that they assume the complete male plumage, spurs grow as they do in the normal cock, head furnishings increase in size until they cannot be distinguished from those of the normal male."



"Other birds in the pen regard them as males and when a strange cock is introduced they fight as would other cocks, very frequently assuming the initiative, some of them having been observed to come off victorious in such a combat. Many of these birds crow regularly. When aroused by a disturbance, it was found that their reaction is very similar to that of the male; the sounds they make, together with their reaction on such occasions, reminds one very much of the young male just prior to maturity.

"One set of experiments may be mentioned as an example; Out of one lot of fourteen females of the same hatch, one was kept as control and thirteen were operated upon between the ages of six weeks and six months: twelve of these have developed all the characteristics of the male mentioned above, some being completely cock-feathered, while the others are fast becoming so. The other one of the thirteen is very capon-like in appearance except perhaps for size and cannot be readily distinguished from her capon brothers by those not knowing her history. This bird has assumed complete male plumage, is developing spurs; but the comb, wattles, and earlobes are pale and small, resembling those of the capon.

"In some of our cases individuals which have assumed more or less complete male characters as concerns head furnishings, plumage, and spurs, are reverting toward the female type as shown by the female type of plumage reappearing.

"Our results indicate that the female in the Brown Leghorn fowl has many potentialities of the male, which are normally inhibited by the presence of the ovary and that these potentialities can assert themselves approximately fully after the complete removal of the ovary at an early age."

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#### WOLF HYDROPHOBIA EPIDEMIC CHECKED

The spread of rabies among wolves on the western plains which a few months ago menaced the herds of numerous ranchers is now reported under control. A few months ago an alarming epidemic of hydrophobia developed among wandering packs of lobo wolves and quickly spread to the kindred coyotes and timber wolves. The mad-dened beasts ranged the ranch country and a general spread of the malady to cattle was feared.

Scores of mad wolves were killed, and government scientists were called upon to conduct an investigation. The U. S. Department of Agriculture made a special study of the wolf rabies epidemic in Utah, and lessons learned from this investigation were valuable in combating the epidemic in other sections. Government hunters in Texas, New Mexico, Arizona and other western states killed numerous mad wolves, and the disease is now believed stamped out.

Investigators of the Department of Agriculture have not determined the exact cause of this unusual malady, which about eighteen months ago reached epidemic form in Utah and western Colorado, but the theory that the disease was caused by the beasts being bitten by a wandering mad dog - perhaps an unfortunate shepherd dog - has been advanced. The disease at one time or another spread to practically every species of the wolf family that roams the western plains.

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Caroa fiber, used by the natives of Brazil for fishing nets, may be made into paper of unusual strength.

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## SYNTHETIC CHEMICALS MAKE NEW ANESTHETIC

Making synthetic rubber has resulted in the discovery of a synthetic chemical substitute for cocaine. Tutokain, the new compound, is made from the intermediate products which have been prepared in the manufacture of artificial rubber. The sale of cocaine has been discouraged in Germany because of its habit forming characteristics. Tutokain is non-poisonous and may be sterilized by heat without decomposition. According to articles in the medical press, it has been used with great success as a local anesthetic.

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## WRONG SHOE POLISH MAKES PEOPLE SICK

Be careful what you use to polish your shoes. Many dyes for shoe leather, and some polishes, contain compounds of anilin which are distinctly poisonous. This was brought to the attention of a meeting of the American Society for Pharmacology by Dr. A. G. Young, of the University of Michigan. Cases of illness have been reported which were traced to the wearing of freshly stained shoes, it seems, and the experiments described were conducted on animals in order to determine the exact nature of the violent attacks of illness which have been suffered by human beings. The symptoms have lasted for several days in many cases of the sickness.

The chief results of the absorption of the dyes by animals were the depressing of the action of the heart, and a change in the coloring matter of the blood. The investigation indicates that freshly stained shoes are not healthy articles of apparel, although in the case of the shoe polishes, the risk is not so great. Only those materials which stain and polish at the same time come under suspicion.

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## OBSCURE DUCTLESS GLAND INFLUENCES EGG PRODUCTION

The emigma of the thymus gland has been solved, or at least partly solved, by Dr. Oscar Riddle of the department of genetics of the Carnegie Institution of Washington. The thymus is one of the ductless glands situated in the neck, and has long been a puzzle to physiologists for its function has never been discovered.

Dr. Riddle has learned, however, by observing certain pigeons with diseased thymus glands, that these control the formation of egg shells, and have further effects on the reproductive processes. Pigeons with thymus glands removed by operation also produced shell-less eggs. Feeding the abnormal birds with thymus made them normal again, and they produced good eggs. Although he has not yet succeeded in isolating this eggshell-producing substance from the thymus, Dr. Riddle gives it a provisional name - "thymovidin".

Though this solves the riddle of the thymus as regards birds, it does not show that the gland has any direct usefulness for mammals, for this higher class of animals does not lay shelled eggs.

Dr. Riddle seems inclined to regard the structure in mammals simply as a surviving ancestral organ. He reasons: "Though not necessary to the life of the individual, thymovidin would seem essential to the perpetuation of those vertebrate species whose eggs are protected by egg-envelopes. Such animals were the ancestors of mammals, and thus mammals also probably could not have come into existence without the thymus."

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## AMERICAN COTTON INDUSTRY FORCES SAHARA RAIL BUILDING

A railroad line across the Sahara desert to connect French Algeria on the north with the potentially rich cotton lands in French West Africa, on the Niger river, is the move now contemplated in French industrial circles, to meet the prospect of diminishing exports of cotton from the United States. It is the increasing number and size of American cotton mills, rather than the boll weevil, that is cutting down the amount of American cotton going abroad, but whatever the cause the French cotton interests feel that they must, if possible, meet the situation on French-owned soil.

There is a great area of land along the upper Niger that is admirably suited for cotton growing; some enthusiasts claim to see in it a second Nile. The country is sparsely populated now, and the natives are unwilling to undertake plantation labor; but the protagonists of the scheme hope to induce colonists from Algiers to settle there.

The building of the railroad is expected to be attended with great difficulties; under the most favorable circumstances it would take twenty years at least. In the meantime, the development of automobile traffic across the desert is being looked to. Last year a motor caravan made the trip and a much more elaborate expedition is now in the field. The cars and tractors used are equipped with caterpillar treads, and a new six-wheeled type of automobile is also being tried out.

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TABLOID BOOK REVIEW

GENERAL AND PHYSIOLOGICAL FEATURES OF THE VEGETATION OF THE MORE ARID PORTIONS OF SOUTHERN AFRICA, WITH NOTES ON THE CLIMATIC ENVIRONMENT. By William Austin Cannon. 159 pages; 31 plates. Washington: The Carnegie Institution. 192.

Ecologists, plant geographers and botanists generally will welcome this addition to the literature of desert plants life. The South African waste is so remote that most Americans never hope to see it; yet it is so interesting, both in its weird endemics like Welwitschia and in the bizarre developments that have taken place in representatives of more familiar plant families, that all plant students and plant lovers feel that they must know something of the region. Prof. Cannon has obligingly done our traveling for a lot of us; his ecological studies are exact and illuminating, and his pictures are among the best that have ever been published of South African plants.

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SCIENTIFIC RESEARCH AND HUMAN WELFARE. By Franklin S. Harris, Ph.D., and Newbern I. Butt, B.S. New York. The Macmillan Company. \$2.50

In this book is found the romance of scientific advancement. It shows the control of the most deadly and virulent diseases and how painless surgery has been developed to lengthened human life.

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Germs can be killed by exposing them for one second to ultra-violet rays of short wave length.